by the glacier. The total thickness of the glacier he estimates at not less than 8,000 feet, and believes that by the slow grinding motion of this ice-sheet all the surface of New England became broken up to great depths. We have again a number of chemical articles and an interesting contribution to geology by Mr. C. H. Hitchcock, on the Norian or Upper Laurentian Group of New Hampshire. In this number there is also, as usual, a variety of miscellaneous information on the various branches of physical and natural science.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, January 25—"On the Action of Low Temperatures on Supersaturated Solutions of Glauber's Salt." By Charles Tomlinson, F.R.S.

"On the Elimination of Alcohol." By A. Dupré, Lecturer on Chemistry at Westminster Hospital. Communicated by W. Odling, F.R.S.—Obviously three results may follow the ingestion of alcohol. All the alcohol may be oxidised and none be eliminated, or a portion only may be oxidised and the rest be eliminated unaltered; or, lastly, all may be eliminated again unaltered. Assuming the last to be the case, it would follow that, if a certain quantity of alcohol be taken daily, the amount eliminated would increase from day to day until, at last, the amount eliminated daily would equal the daily consumption, be this time five, ten, or more days. If, on the other hand, all the alcohol consumed is either oxidised or eliminated within twenty-four hours, no increase in the daily elimination will take place in consequence of the continuance of the alcohol diet. Guided by these considerations the author undertook two series of experiments, in which the amount of alcohol eliminated by both kidneys and lungs was carefully estimated. The analytical processes employed are described in detail. First series:—After a total abstinence from alcohol for eleven days, the urine and breath were examined, after which, from the 12th to the 24th day, both inclusive, the author took 112 cub. centims. of brandy daily (equal to 48·68 grms. absolute alcohol). The urine and breath were examined on the 12th, the 18th, and the 24th day. The urine was also examined during the five days following the cessation of the alcohol diet. The analytical results obtained are given in a table. Second series:—After having again abstained from the use of alcohol in any shape during ten days, the author took 56 cub. centims. of brandy (same as above) at 10 A.M. on March the 29th. The urine was collected from three to three hours up to the 12th, from the 12th to the 24th, and during the next succeeding two days. The alcohol eliminated in the breath was also estimated during the same intervals. The analytical results are also arranged in a tabular form. The results of both series may be summed up as follows:—The amount of alcohol eliminated per day does not increase with the continuance of the alcohol diet; therefore all the alcohol consumed daily must, of necessity, be disposed of daily; and as it certainly is not eliminated within that time, it must be destroyed in the system. The elimination of alcohol following the ingestion of a dose or doses of alcohol ceases in from nine to twenty-four hours after the last dose has been taken. The amount of alcohol eliminated, in both breath and urine, is a minute fraction only of the amount of alcohol taken. In the course of these experiments, the author found that, after six weeks of total abstinence, and even in the case of a teetotaller, a substance is eliminated in the urine, and perhaps also in the breath, which, though apparently not alcohol, gives all the reactions ordinarily used for the detection of traces of alcohol, viz., it passes over with the first portions of the distillate, it yields acetic acid on oxidation, gives the emerald-green reaction with bichromate of potassium and strong sulphuric acid, yields iodoform, and its aqueous solution has a lower specific gravity and a higher vapour tension than pure water. The presence of a substance in human urine and the urine of various animals, which yields iodoform, but is not alcohol, had already been discovered by M. Lieben. The quantity present in urine is, however, so small that the precise nature of this substance has not as yet been determined. Finally, the author points out an apparent connection between this substance and alcohol. It was found that, after the elimination due to the ingestion of alcohol had ceased, the amount of this substance eliminated in a given time at first remained below the quantity normally excreted, and only gradually rose again to the normal standard. A careful study of this connection may perhaps serve to throw some light upon the physiological action of alcohol.

"The Absolute Direction and Intensity of the Earth's Magnetic Force at Bombay, and its Secular and Annual Variations." By Mr. Charles Chambers, F.R.S., Superintendent of the Colaba Observatory.—The observations discussed in this paper were taken at the Colaba Observatory during the years 1867 to 1870, and consist of observations of Dip, Declination, and Horizontal Intensity. The principal results deduced by the author from these observations are shown in the following statement:—

Magnetic Element	Epoch.	Value at epoch.	Value at common epoch, January 1st, 1869.	Secular change. — Per annum.	Semiannual inequality — Excess of April to September over mean of year	Calculated probable error of a single weekly determination.
		° ′ ″	° ′ ″	′ ″	″	″
Declination . .	April 1, 1868	0 46 47 E.	0 48 56 E.	+2 5	+1	±20
Dip	Oct. 1, 1868	19° 4′·2	19° 4′·7	+1 9	+0′·3	±0′25*
Horizontal Force .	April 1, 1869	8·0591	8·0581	+·0040	·0000	±·0043*
Total Force . .	Jan, 1. 1869	8·5264	8·5264	+·0059	+·0003	—

In column 2 is entered the mean epoch to which the mean value of each element, entered in column 3, corresponds.

The absolute observations were taken at a height of 38 feet above the ground, and by comparing them with observations taken with differential instruments at a height of 6 feet above the ground, they are shown to indicate distinctly a diminution of terrestrial magnetic action with increase of height, with respect both to secular variation of Declination and Horizontal Force, and to diurnal inequality of Horizontal Force.

Royal Geographical Society, January 22.—Sir H. C. Rawlinson, president, in the chair.—Mr. C. R. Markham, secretary, read, at the request of the president, the following statement regarding the proposed Exhibition for the Search and Relief of Dr. Livingstone:—"Letters were received from Livingstone, dated at Lake Bangweolo, on July 8, 1868, and the last that have come to hand were dated Ujiji, May 30, 1869. He announced that the work still before him was to connect the lakes he had discovered; and he intended to explore a lake to the westward of Tanganyika, in the Manyema country, and thence to complete his labours, but he was sorely in need of men and supplies. The Arab traders interested in the slave-trade were anxious to thwart him, and no one would take charge of his letters. He mentioned having written thirty-four letters which had been lost. This is the last positive news from Dr. Livingstone. There was one Arab report in November 1870, that he was at the town of Manakoso, with few followers, waiting for supplies, and unable to move; but the last certain intelligence will be three years old on the 30th of next May. The question now is, shall this great and noble-hearted man be left to his fate? In January 1870 the Treasury sanctioned a grant of 1,000*l.* to send stores by natives from Zanzibar through the political agent; but this method of affording relief failed, and neither letters from Livingstone nor proof that he ever received the stores have reached the coast. Mr. Stanley, an American traveller, has also attempted to penetrate into the interior, but he was stopped by disturbances at Unyanyembe. It has thus become clear that, if Livingstone is to be relieved, a properly equipped expedition, ably commanded, must be despatched from this country to do the work. The Lords of the Treasury have declined to grant any pecuniary aid to the expedition which is destined to bring succour to Dr. Livingstone, who, it must always be remembered, is Her Majesty's Consul for the interior of Africa. No adverse decision from the Treasury will, however, be allowed to check the necessary preparations, nor to retard them for a single day. The known facts upon which the Council of the Society have had to base their decision are few, but they all pointed to one obvious course. According to the latest rumours, which were to some extent corroborated by the great traveller's expressed intention, Dr. Livingstone is in the Manyema country, to the westward of Lake Tanganyika, where he may be prostrated by sickness, and where, at all events, according to his last letters, he was urgently in want of supplies. As experience has proved that it would not be safe to entrust the charge of supplies to the Arab traders, the only alternative is to despatch a relief expedition led by Europeans, and the Council of the Society had determined on that course. The fortunate accident that an excellent opportunity offered itself of reaching Zanzibar in the first steamer that has ever made the direct voyage by the Suez Canal was a sufficient reason for the rapidity with which it was necessary to prepare and despatch the expedition. Nearly 200 persons had volunteered to take part in the expedition, and the choice of a leader had fallen upon Lieut. Llewellyn Dawson, R.N., a scientific seaman, who possessed most of the qualifications which were needed to fill so difficult and trying a post, and in whose ability and judgment the Council had perfect confidence. It was intended that he should be accompanied by a second in command, and the Foreign Office had applied to the Admiralty that any naval officer who served on this expedition should be rated on one of Her Majesty's ships, so as to be allowed time and full pay. Mr. W. Oswell Livingstone, Livingstone's son, who was born twenty years ago in the neighbourhood of Lake N'gami, would also accompany the expedition. It was hoped that Mr. New, a gentleman connected with the Mombas Mission, would act as interpreter, and the party would in all consist of an escort of about fifty picked men, besides porters. It would leave England early in February in the *Abydos* steamer, chartered by Messrs. J. Wiseman and Co., who had generously undertaken to convey all stores free of charge, and, if possible, to secure reduced charges for passages for the members of the expedition." A discussion ensued on the reading of this statement, in which Mr. J. R. Andrews, Dr. Purcell, Mr. Lee, Mr. J. Ball, Admiral Collinson, Mr. Thorpe, the Rev. Horace Waller, and others joined. The letter from the Treasury declining to aid was called for and read, and comments made on the possible meaning of the chief sentence in the letter—"A new expedition is not the only means left through which Dr. Livingstone's safety may with reason be hoped for." The following communications were read:—1. "Letter to Dr. Kirk on an Ascent of Kilimanjaro." By the Rev. Charles New, of Mombasa. This letter describes the recent visit of the author to Chagga and his ascent of Mount Kilimanjaro to the snow-line. Mr. New had made a collection of plants growing in the upper zones of vegetation on the mountain which he had forwarded to Dr. Hooker at Kew. He described the varied zones, from the tropical country at the base of the mountain up to the magnificent snow-coloured dome which forms the summit. The lower slopes were covered with dense forests of gigantic trees clothed with mosses, the upper of heaths and green pastures. 2. "Ascent of the Padass River and Visit to the *Muruts* Country in Northern Borneo." By Lieut. C. de Crespigny, R.N. This journey was undertaken in the search of ourang-otangs or *Mias*, which abound in that part of Borneo. The Padass rises on the slopes of the lofty mountain Kini-balu, and flows through a plain furrowed by the courses of many other rivers. Much information was given concerning the *Paluans* and *Muruts*, and other little-known tribes, and cases of the employment of ourang-otangs as domestic servants, employed to collect fire-wood, &c., were given.

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* In English units.

Entomological Society, January 22.—Mr. A. R. Wallace, president, in the chair.—The Rev. T. A. Marshall, and Messrs. H. W. Bates, A. Müller, and F. Smith, were elected into the council, to replace members retiring therefrom. Prof. Westwood was elected president; Mr. S. Stevens treasurer; Messrs. McLachlan and Grut, secretaries; and Mr. Janson, librarian. The retiring president read an address, and the meeting ended with the usual votes of thanks to the officers.

Victoria Institute, January 22.—Mr. Charles Brooke, F.R.S., in the chair.—Dr. W. M. Ord, "On the influence of colloid matters upon crystalline forms," illustrated by numerous diagrams and specimens. Having briefly defined the use of the terms, he proceeded to show that when crystalline substance was deposited in a colloid, such as gum or albumen, it assumed not a crystalline, but a globular form. Diagrams showing the various changes that took place illustrated this part of the lecture. The action of salt water on the carbonate of soda in the case of the shell of the lobster, and the changes in the organisms were explained; the formation of bone in hawk-man tortoise and the codfish were alluded to, and Dr. Ord concluded by drawing attention to the importance of the investigation of the chemistry of colloids.

GLASGOW

Geological Society, January 11.—Mr. John Young, vice-president, in the chair. Mr. James Thomson, F.G.S., read a paper on *Palæocoryne scoticum* and *P. radiatum* from the carboniferous shales of the West of Scotland. He stated that at the first excursion of the society to Corrieburn, in 1858, he had observed in some portions of shale a small, delicate, stellate body which he could not refer to any genus or species he had seen described. Since then, at various Saturday afternoon excursions of the society, he had discovered other forms of a similar kind. He had consulted the collections of the Geological Society, the Government Museum of Practical Geology, and the British Museum in London, without finding any similar organisms; and lacking the necessary facilities for prosecuting the work himself, he had at length placed them in the hands of Prof. Duncan, in order that they might be identified and named. On investigation Prof. Duncan found them to be new and undescribed forms which could only be referred to the *Hydrozoa*. The calcareous investments of these *Palæocorynida* made their recognition as true Hydrozoa a matter of some difficulty; but this had been overcome by the examination of the anomalous genus *Bimeria* (Wright), which, as pointed out by Prof. Duncan, shows a very decided resemblance to the fossil under consideration, the semi-solid investment being continued over the greater part of the tentacles and upper part of the body. These minute but interesting forms are found both in our highest and lowest beds of limestone—at Roughwood, Broadstone, Auchinskeigh, and Gare—and their discovery may be said to add another link to the chain that unites the present with the remote past.—Mr. Thomson also gave notes on a new species of *Palæchinus*, from the limestone shale of Auchinskeigh. It was most nearly allied to Dr. Scoular's species *sphæricus*, but differed in the form and ornamentation of both the ambulacral and interambulacral plates. He proposed to name it provisionally *Palæchinus scoticus*. Mr. Thomson exhibited the fossils and some beautiful microscopic sections in illustration of his paper.

PARIS

Academy of Sciences, January 22.—A paper by M. J. Boussinesq on the geometrical laws of the distribution of pressures in a homogenuous and ductile solid, subjected to plane deformations, was communicated by M. de Saint-Venant.—M. Faye read a note on Encke's comet and the phenomena which it presented at its last appearance.—A sixth letter from Father Secchi on the solar protuberances was read, containing a tabulated summary, with explanations of all the observations made upon the protuberances during the year 1871.—M. Trémaux forwarded a note on phenomena indicating the condition of the sidereal medium.—M. Delaunay communicated a note by MM. Prosper and Paul Henry, on the construction of very detailed celestial maps, and exhibited a map prepared by them on the principle indicated.—A note on the Meteorological Annual of the Paris Observatory for 1872, by M. E. Renon, was read; the author criticises some of the numerical results given in that volume.—M. E. Dubois presented a note on a marine gyroscope.—M. H. de Jacobi communicated his researches on the induction currents produced in the coils of an electro-magnet between the poles of which a metallic disc is set in motion; this paper contains results of great value.—A note by M. E. Liais on the spectrum analysis of the zodiacal light and on the corona of eclipses was read. The author states that he has found that the spectrum of the zodiacal light is continuous, and calls attention to his previous observations on the solar corona, the nature of which he claims to have established in 1858.—MM. Becquerel presented a note on the temperature of soil observed at the Jardin des Plantes, at the Observatory, and at Montsouris during December 1871 at 10 centimetres below the surface.—M. I. Pierre read a note on the simultaneous distillation of water and iodide of butyle, in which he stated that iodide of butyle boils under water at 204·8° F., rising through the water in drops with a bubble of vapour attached to each, and that during this ebullition the two liquids pass over in the proportion of 21 water to 79 iodide. Iodide of ethyle behaves similarly.—M. H. Sainte-Claire Deville presented a report on a memoir by M. Grüner on the action of oxide of carbon upon iron and its oxides.—A note by M. A. Rosenstichl, on a method of separating the two isomeric toluidines, was read.—M. P. Thenard presented a note by M. A. Houzeau on the preparation of ozone in a concentrated state.—The discussion on the subject of heterogenesis, commenced at the last meeting, was continued in two notes by MM. Balard and Fremy, and in a paper by M. Pasteur on the nature and origin of ferments.—M. J. de Seynes also presented a note in reply to a passage in M. Trécul's memoir.—M. Monnier read a paper on the functions of the respiratory organs in aquatic larvæ.—M. C. Bernard presented a memoir by MM. A. Estor and C. Saint-Pierre on the analysis of the gases of the blood; and M. Brongniart communicated a note by M. de Saporta on the fossil plants of the Jurassic epoch.

Vienna

I. R. Geological Institution, January 16.—M. von Hauer presented the third number of the "Memoirs of the Geological Institution," containing a monograph of the Echinoderms of the more recent tertiary deposits of the Austro-Hungarian empire, by Dr. G. Laube.—M. G. Tschermak explained the contents of a memoir sent by Dr. C. W. C. Fuchs, from Heidelberg, for the "Mineralogische Mittheilungen." The author details the chemical processes which take place in lavas at the moment of the eruption, and by the observation of broken crystals in the lava, concludes that the melted masses, some time before the eruption, must have had a higher temperature than in the moment of eruption.—M. Th. Fuchs demonstrated some detailed sections of the upper tertiary strata in the neighbourhood of Vienna. They seem to prove that the marine sands appear in some localities below, in others above, the Leitha limestone.—M. Ch. Paul, on the upper tertiary strata of Sclavonia. They are divided into three different members, corresponding to the three great divisions of the strata of the Vienna basin. The lowest division, the marine beds, consists chiefly of calcareous strata, the Leithakalk. The middle division, the sarmatic beds, is formed of a large mass of sandstones which are overlain by white sands of fresh water origin. The congerian beds, finally, are separated into two members—the lower containing large layers of lignite, and characterised by *Unio maximus*, *Paludina Sadleri*, and other species of this genus with smooth shells; and the upper, without lignites and containing an entirely different fauna, also with many species of *Paludina* with ribbed and ornamented shells.—Fr. von Hauer, on new geological discoveries in Eastern Transylvania, made by F. Herbich. Between Barsyek, on the Moldavian frontier, and the region south of Kronstadt, a large range of mountains consisting chiefly of calcareous strata is developed, which had formerly been regarded as belonging almost entirely to the Jurassic formation. The recent investigations of Mr. Herbich, on the contrary, show that here are developed almost all the particular types of Alpine formations of mesozoic ages. The Trias is represented by the Wurfenslater and Guttenstein limestone, which are overlain by red Hallstatt marbles, with *Ammonites Metternichii*, &c.; the Lias by the Grosten and Adneth strata, &c. It is very remarkable that some of these strata—for instance, the Hallstatt marbles—are entirely wanting in the whole range of the Northern Carpathians, which connect the Transylvanian mountains with the Eastern Alps.

BOOKS RECEIVED

English.—Zanzibar; City, Island, and Coast: Capt. R. F. Burton. 2 vols. (Tinsley Brothers).—Queen Charlotte Islands: F. Poole, edited by J. Lyndon (Hurst and Blackett).—Chemical Notes for the Lecture Room, 3rd edition: Thos. Wood (Longmans).—The Differential Calculus: F. Wilson (Longmans).—The Pipits: by the Author of Caw-Caw (Glasgow, J. Maclehose).

Foreign.—(Through Williams and Norgate.)—Die Krankheiten des Linsensystems: Dr. Max Salomon.—Lehrbuch der anorganischen Chemie, 2^{te} Abtheilung: Dr. Ph. Th. Büchner.—Jahresbericht über die Fortschritte der Chemie für 1869. Heft 2: Ad. Stricker.—Zoologische Mittheilungen, Band 1: Dr. L. W. Schaufuss.—Thesaurus Ornithologiæ, Band 1: Dr. C. G. Giebel.—Botanische Untersuchungen, 1: Dr. N. J. C. Müller.—Geschichte der Himmelskunde: Dr. J. H. von Mädler.—Thesaurus Literaturæ Botanicæ, Fas. 1: G. A. Pritzel.—Die Foraminiferen des schweiz. Jura: Dr. J. Kübler.

DIARY

THURSDAY, February 1.

Royal Society, at 8.30.—On the Lunar Variations of Magnetic Declination at Bombay: C. Chambers, F.R.S.—On a Possible Ultra-Solar Spectroscopic Phenomenon: Prof. Piazzi Smyth, F.R.S.—On the Normal Paraffins: C. Schorlemmer, F.R.S.

Society of Antiquaries, 8.30.—On a Camp opposite Clifton on Leigh Down, with Remarks on Vitrified Forts: Rev. H. M. Scarth.

Chemical Society, at 8.—On the Relation between the Atomic Theory and the Condensed Symbolic Expressions of Facts and Changes (Dissected Formulæ): Dr. C R. A. Wright.

Linnean Society, at 8.—On the Classification and Geographical Distributions of Compositæ: The President.

FRIDAY, February 2.

Geologists' Association, at 7.—Special General Meeting.—On the Chloritic Marl Deposits of Cambridge: Rev. T. G. Bonney, F.G.S.

Archæological Institute, at 8.

Royal Institution at 9.—On the Identity of Light and Radiant Heat: Prof. Tyndall, F.R.S.

SATURDAY, February 3.

Royal Institution, at 3.—On the Theatre in Shakespeare's Time: Wm. B. Donne.

MONDAY, February 5.

Royal Institution, at 2.—General Monthly Meeting.

Entomological Society, at 7.

London Institution, at 4—Elementary Chemistry: Prof. Odling, F.R.S.

Anthropological Institute, at 8.—Anniversary Meeting.—On Hereditary Transmission: Geo. Harris.—Strictures on Darwinism: H. H. Howorth.—The Wallons: Dr. Charnock and Dr. Carter Blnke.

TUESDAY, February 6.

Royal Institution, at 3.—On the Circulatory and Nervous Systems: Dr. W. Rutherford, F.R.S.E.

Zoological Society, at 9.—Contributions to a General History of the Spongiadæ, Part I: Dr. Bowerbank.—Notes on *Rhinoceros sumatrensis*, with a photograph from life: Dr. John Anderson.

Society of Biblical Archæology, at 8.30.—On an Inscription in Hebrew or Ancient Phœnician Characters, discovered at Siloam, of the Age of the Kings of Juda: Ch. Clermont Ganneau.

WEDNESDAY, February 7.

Geological Society, at 8.—On the Geology of the Neighbourhood of Malaga: M. D. M. d'Orueta.—On the River-Courses of England and Wales: Prof. A. C. Ramsay, F.R.S.—Migrations of the Graptolites: Dr. H. Alleyne Nicholson, F.R.S.E.

Society of Arts, at 8.—On the Forests of England, their Restoration, and Scientific Management: T. W. Webber.

Microscopical Society, at 8.—Anniversary Meeting.

Pharmaceutical Society, at 8.

THURSDAY, February 8.

Royal Institution, at 3.—On the Chemistry of Alkalies and Alkali Manufacture; Prof Odling, F.R.S.

Royal Society, at 8.30.

Mathematical Society, at 8.—On the Factors of the Differences of Powers, with especial reference to a theorem of Fermat's: Mr. W. Barrett Davis.—On an Algebra cal Form and the Geometry of its dual connection connection with a polygon, plane, or spherical: Mr. T. Cotterill.

Society of Antiquaries, at 8.30.

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Errata.—P. 243, col. 2, line 6 from top, prefix "vertical" to "band;" line 10, for "table" read "tall."